

COMBINATION POLE

DECORATIVE CITY OF COLUMBUS MAST ARM

CITY OF COLUMBUS, OHIO
DEPARTMENT OF PUBLIC SERVICE
DIVISION OF DESIGN AND CONSTRUCTION

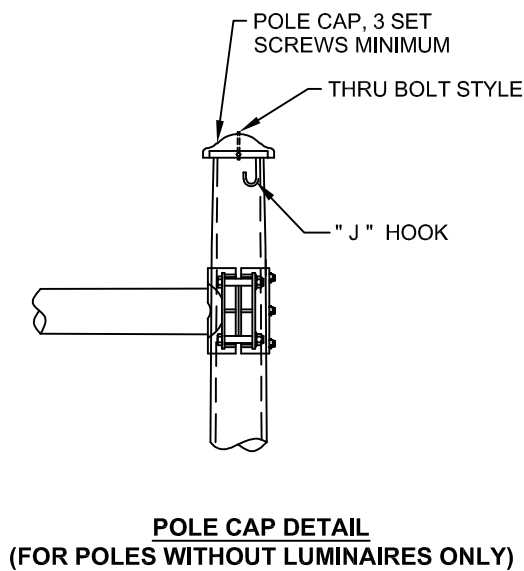
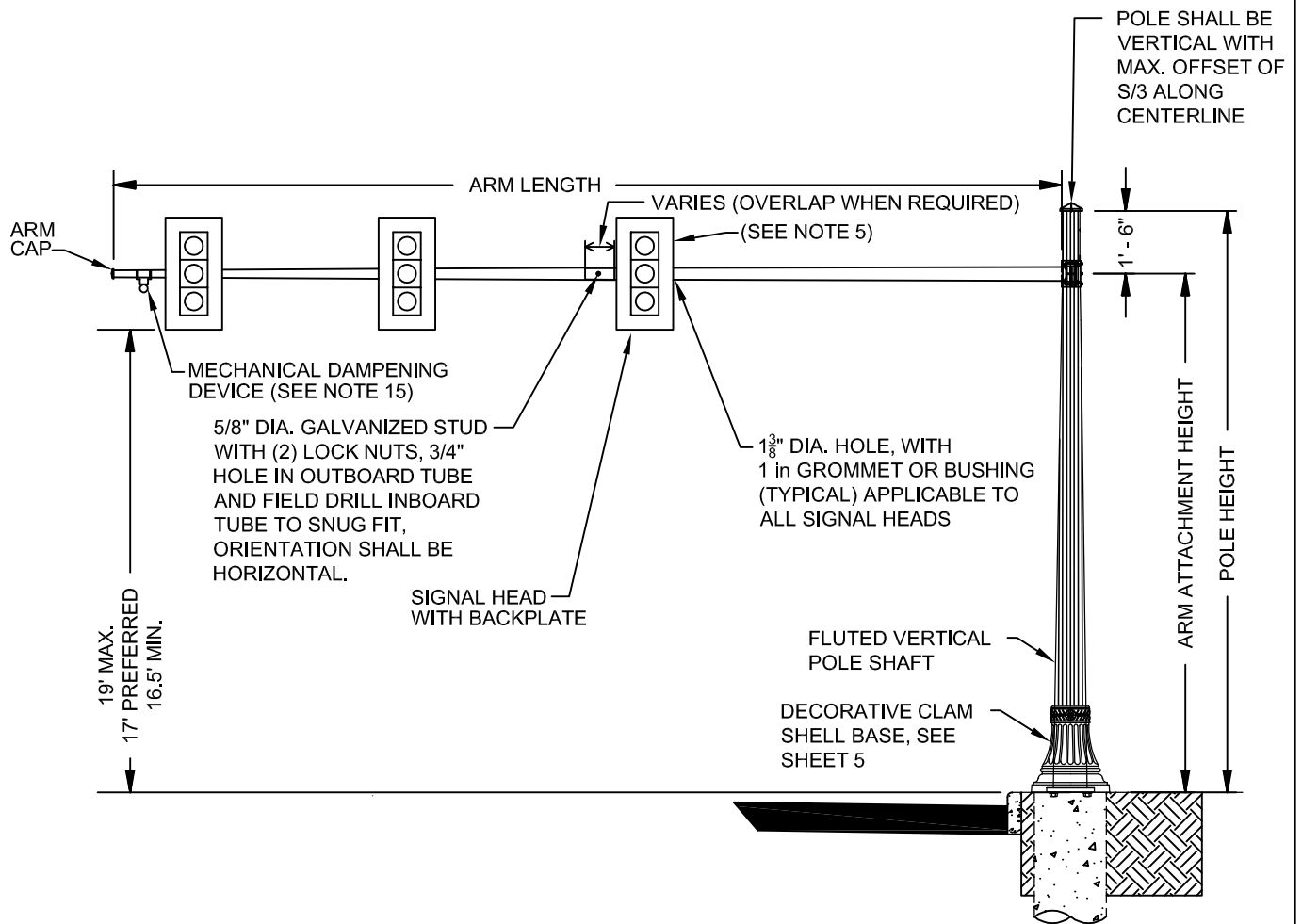
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NON-COMBINATION POLE

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TABLE 1 - PART A - POLE DIMENSIONS

DESIGN NO.	MAXIMUM DESIGN AREA SQ FT (NOTE A)	DESIGN DISTANCE FROM CL FT	POLE			ARM			
			TYPE	WALL THICK	BASE DIAMETER	MAX. LENGTH	TYPE	WALL THICK	SIZE
4	42	37.5	16-FLUTES	.250	13.00	38'	ROUND	.250	10.50x5.18x38"
12	42	47.5	16-FLUTES	.250	14.50	48'	ROUND	.250	11.50x7.72x27' +
								.179	8.33x5.18x22.5'
13	40	59.5	16-FLUTES	.250	16.00	60'	ROUND	.313	11.50x7.72x27' +
								.179	8.33x3.47x34'
14	38	69.5	16-FLUTES	.313	15.50	70'	ROUND	.313	12.75x8.41x31' +
								.179	9.05x3.31x41'
C15	50	78.5	16-FLUTES	.313	18.00	79'	ROUND	.313	14.25x8.65x40' +
								.250	9.44x3.70x41'
C16 (DOUBLE ARM)	48 / 48	49.5 49.5	16-FLUTES	.313	15.50	50'/50'	ROUND	.250	12.00x9.62x17' +
								.179	10.26x5.40x34.75'
								.250	12.00x9.62x17' +
								.179	10.26x5.40x34.75'

ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.

*=SINGLE PIECE ARM

TABLE 1 - PART B - POLE DIMENSIONS

DESIGN NO.	ARM ATTACHMENT									ANCHOR BASE						
	A1	A2	B	C	D	E	F	G	U	BOLT CIRCLE	S	J	K	T	R	H
4	17.5	19.5	17.5	14	14	1.5	1.25	1.25	10	18	18.5	12.75	6	2	2	2.13
12	19	21	19	15	15	1.5	1.25	1.25	11	20	20.5	14.13	6	2	2	2.38
13	21	23	21	17	17	2	1.5	1.5	13	22	23	15.56	6	2	3.5	2.38
14	21	23	21	17	17	2	1.5	1.5	13	22	23	15.56	6	2	3.5	2.38
C15	25	27	25	20	20	2	2	2	16	24	24	17	8	2	2	2.38
C16 (DOUBLE ARM)	21	23	21	17	17	2	1.5	1.5	13	22	23	15.56	6	2	3.5	2.38
	21	23	21	17	17	2	1.5	1.5	13							

ALL DIMENSIONS ARE IN INCHES, UNLESS OTHERWISE NOTED.

THESE DESIGNS USE FULL PENETRATION WELDS AT THE ARM AND BASE PLATE CONNECTIONS.

NOTES:

A. MAXIMUM DESIGN AREA IS BASED ON 90 MPH DESIGN WIND SPEED WITH A PRESSURE OF 25 PSF.

B. DIMENSION LOCATIONS ARE ILLUSTRATED ON SHEETS 4 & 6.

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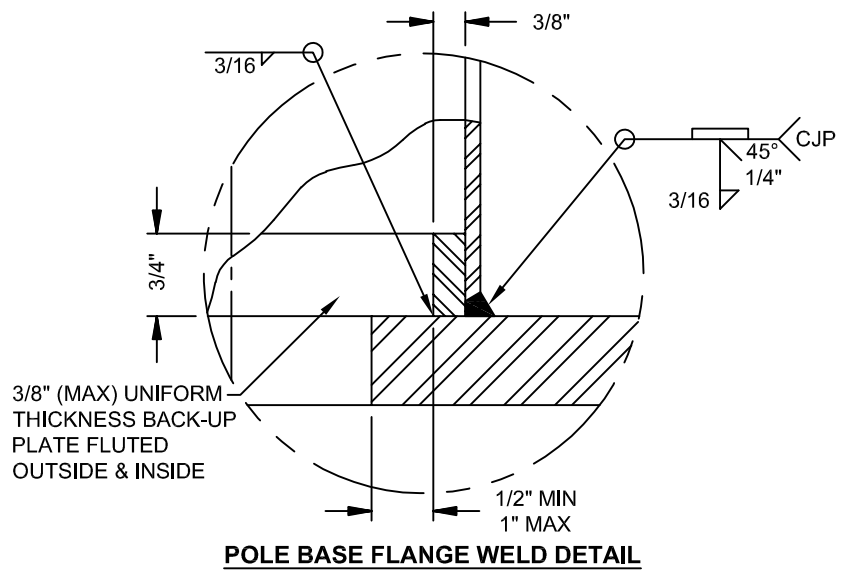
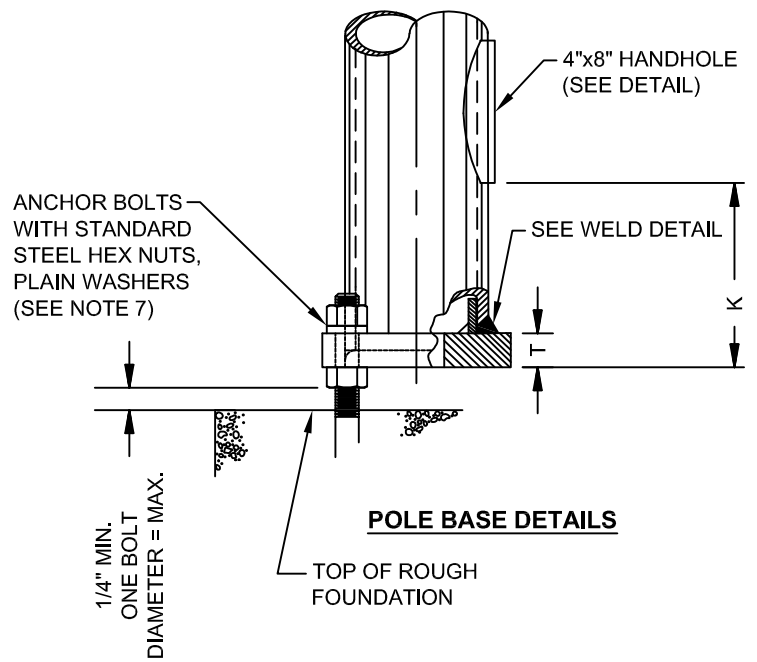
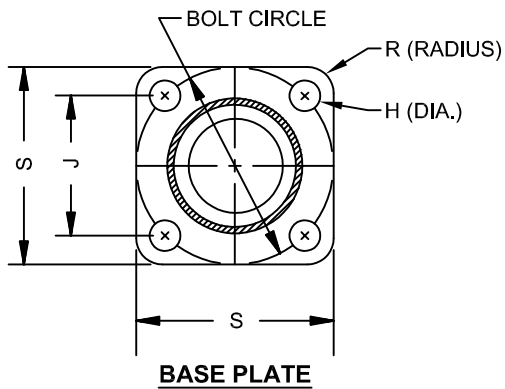
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BASE CONNECTION

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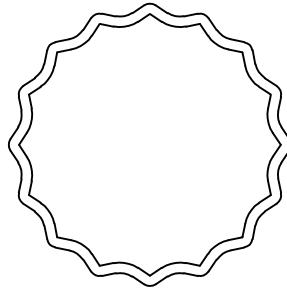
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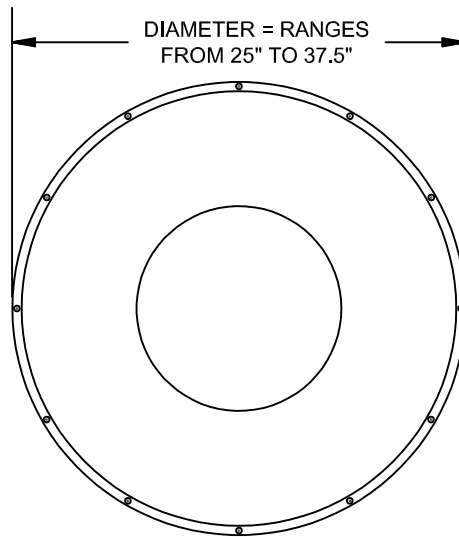
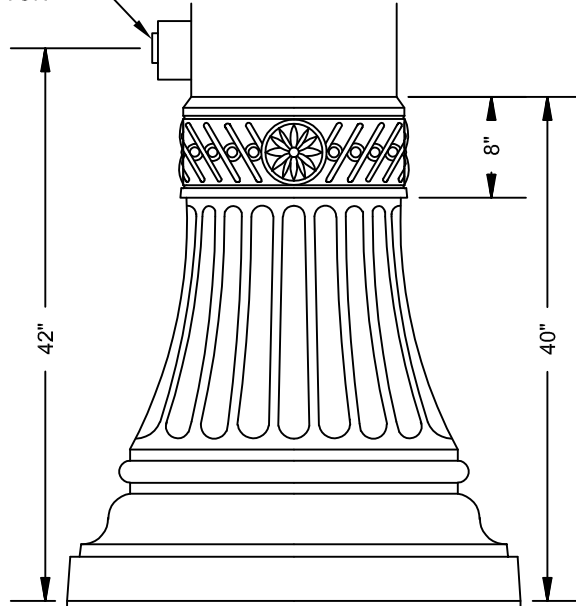
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16 SHARP FLUTE

PEDESTRIAN
PUSHBUTTON



DIAMETER = RANGES
FROM 25" TO 37.5"

NOTES:

THE HANDHOLE IN DECORATIVE BASE SHALL
BE OF SUFFICIENT SIZE AND BE ALIGNED WITH
THE HANDHOLE IN THE SUPPORT POLE TO
ALLOW FULL ACCESS TO THE POLE HANDHOLE.

DECORATIVE BASE MATERIAL SHALL BE MADE
FROM CAST ALUMINUM.

DECORATIVE BASE

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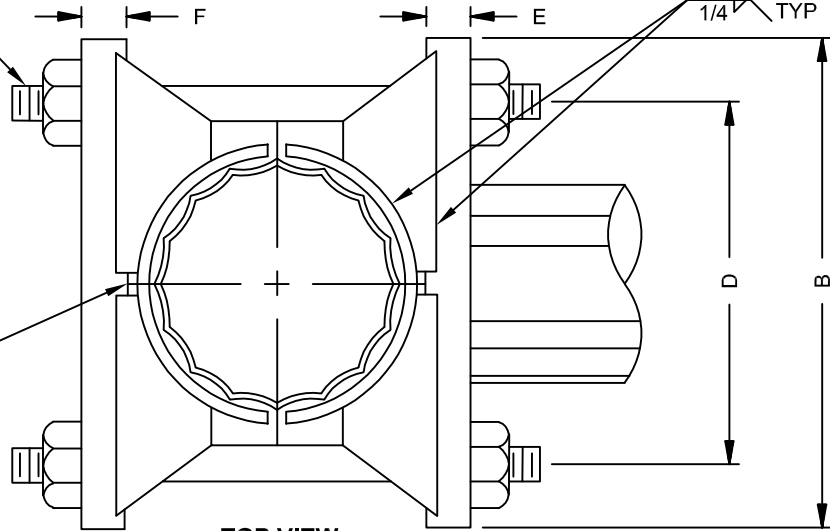
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(G)-STUD DIA. (4)-STUDS
EACH WITH (2)-HEX NUTS
& (2) FLAT WASHERS (SEE
NOTE 1 AND 30)

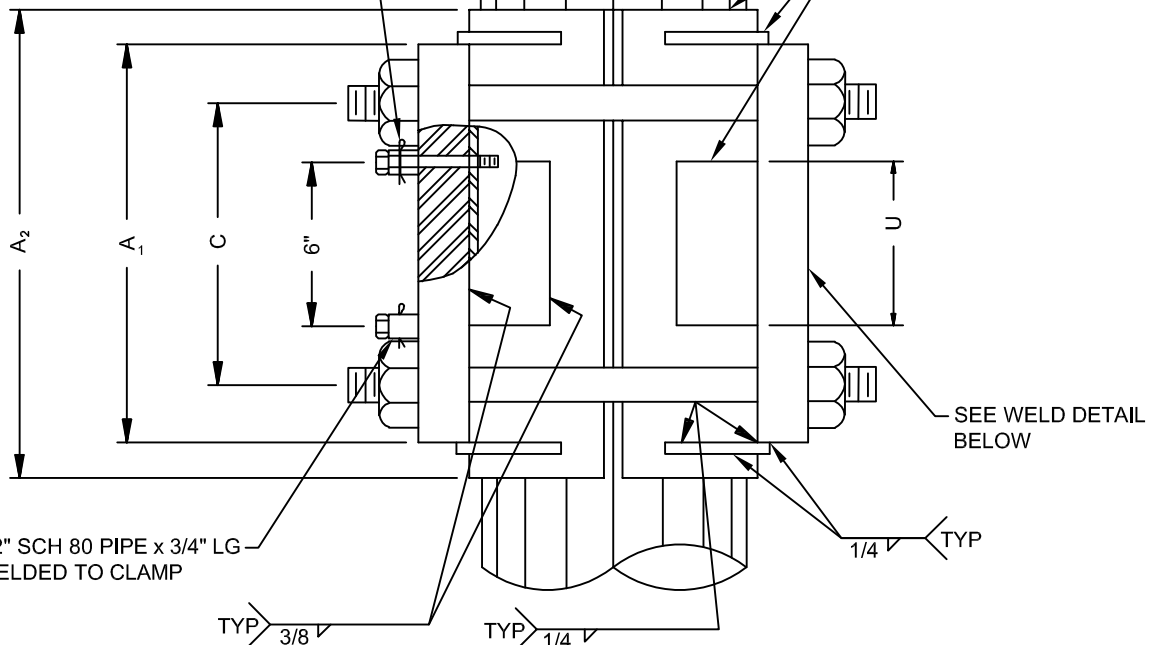
TYP $\frac{1}{4}$ V



TOP VIEW

(2)-1/2" 13NC x 3 1/2" LG HEX
HD CAP SCREWS (FIELD
DRILL 5/8" DIA. HOLES IN
POLE) 3/16" DIA. HOLES
THRU PIPE & BOLT FOR 1/8"
x 1 1/2" COTTER PINS

PLATE THICKNESS 3/8"
(SEE NOTE 4)



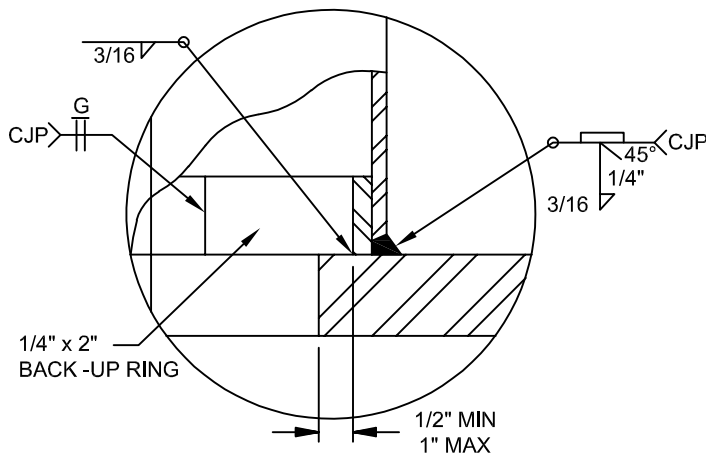
1/2" SCH 80 PIPE x 3/4" LG
WELDED TO CLAMP

SEE WELD DETAIL
BELOW

TYP $\frac{3}{8}$ V

TYP $\frac{1}{4}$ V

SECTION VIEW



ARM FLANGE WELD DETAIL

MAST ARM CLAMP CONNECTION

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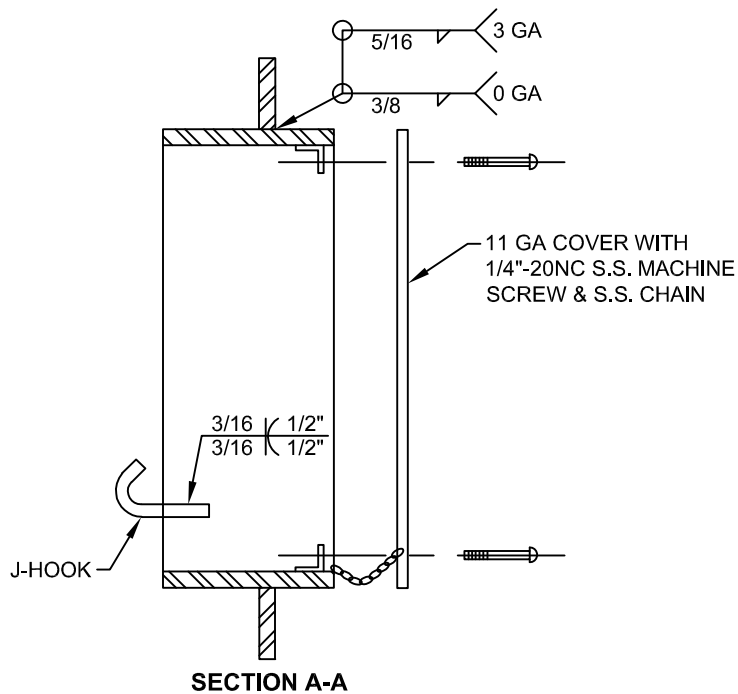
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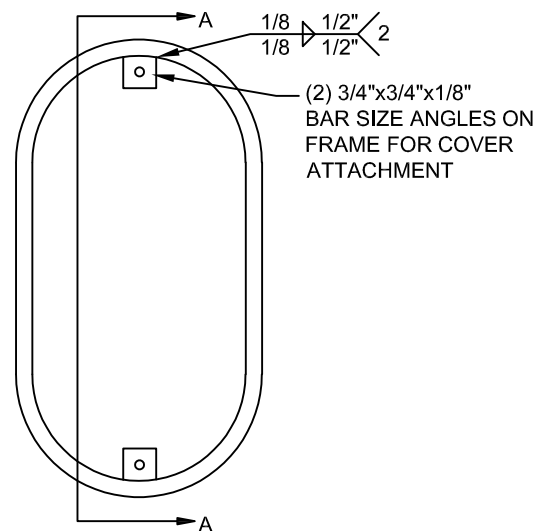
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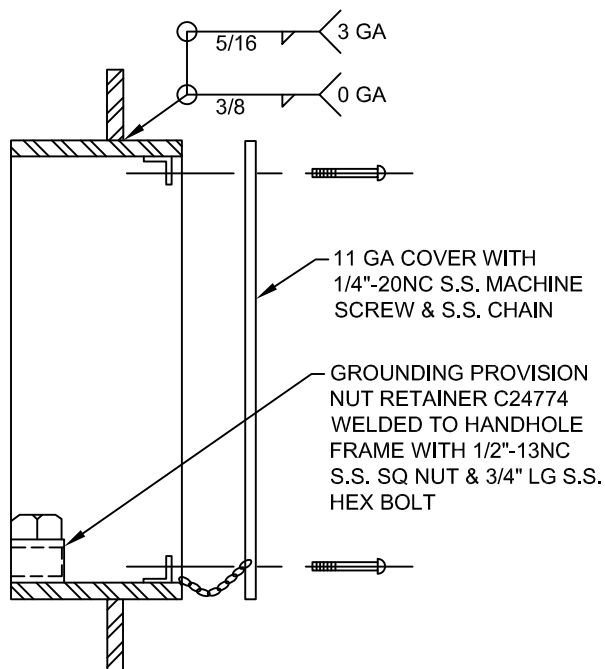
SECTION A-A



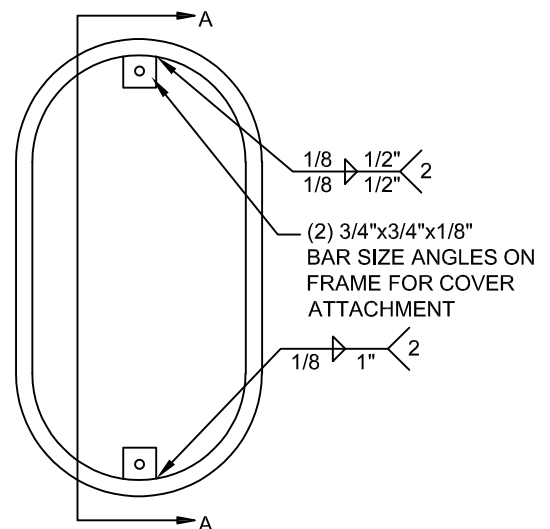
FRONT VIEW

3" x 5" HANDHOLE NEAR BRACKET ARM FRAME DETAIL

4" x 6" HANDHOLE NEAR MAST ARM FRAME DETAIL



SECTION A-A



FRONT VIEW

4" x 8" BOTTOM HANDHOLE FRAME DETAIL

HANDHOLE

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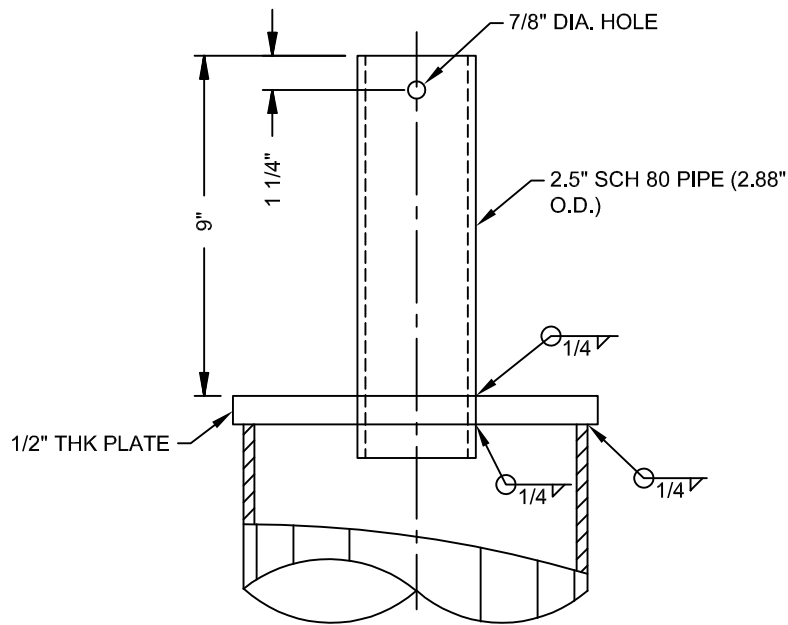
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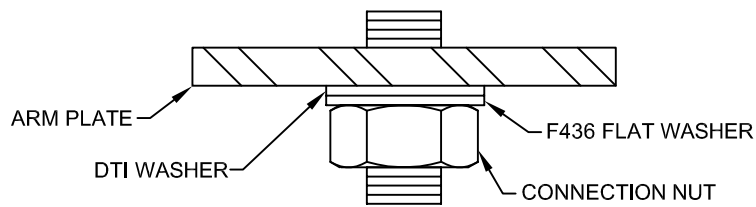
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TOP OF POLE DETAIL
(FOR POLES WITH LUMINAIRE ONLY)

LUMINAIRE BRACKET ARM NOT SHOWN FOR CLARITY. SEE MIS-104 FOR ADDITIONAL DETAILS.



DTI WASHER PLACEMENT
(FOR DESIGNS 13, 14, C15 & C16)
(SEE NOTE 30)

POLE TENON / DTI WASHER PLACEMENT

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NOTES:

1. ARM PLATE HOLE DIAMETER SHALL BE BOLT DIAMETER PLUS 1/8". (SEE SHEETS 1 AND 2.)
2. FOR SIGN MOUNTING DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4251 AND 4252.
3. FOR FOUNDATION DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.
4. THE ARM ATTACHMENT PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. THE POLE ATTACHMENT TO THE BASE PLATE SHALL BE WELDED USING A FULL PENETRATION WELD. (SEE SHEETS 4 AND 6.)
5. FOR SIGNAL ATTACHMENT DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.
6. FOR BRACKET ARM DETAILS, SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWINGS 4110.
7. A MINIMUM OF ONE BOLT THREAD SHALL REMAIN ABOVE THE ANCHOR NUT. (SEE SHEET 4.)
8. ALL UNUSED COUPLINGS SHALL BE PROVIDED WITH A REMOVABLE GALVANIZED CAST IRON PLUG.
9. FOR POLE AND BASE PLATE DIMENSIONS, SEE TABLES 1A AND 1B. (SEE SHEET 3.)
10. WHEN FREE SWINGING VEHICULAR SIGNAL HEADS ARE PERMITTED, THE WIRE ENTRANCE PART OF THE SIGNAL HEAD MAY BE ORIENTED IN ANY DIRECTION TO KEEP THE CABLE DRIP LOOP FROM RUBBING ON THE SIGNAL HEAD. THE SIGNAL HEAD SHALL HANG LEVEL AND PLUMB. (SEE CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4201.)
11. FOR DETAILS AND LOCATION OF HAND HOLES, SEE FLUSH HAND HOLE AND OPTIONAL HAND HOLE DETAILS. (SEE SHEETS 1, 2, AND 7.)
12. THE DESIGN LOADS WERE CALCULATED AS THE EQUIVALENT AMOUNT OF SIGNAL AREA THAT COULD BE CARRIED AT THE END OF THE ARM.
13. THE DESIGN LOADS WERE DEVELOPED WITHOUT APPLYING GALLOPING FATIGUE LOADS. ALSO, THE STRESS REQUIREMENTS OF NOTE B, TABLE 11-2 IN THE AASHTO CODE WERE NOT APPLIED.
14. THESE STRUCTURES SHOULD BE INSPECTED FOR EXCESSIVE WIND INDUCED DEFLECTION IN THE VERTICAL DIRECTION. IF FOUND, A DAMPING DEVICE SHOULD BE PLACED ON THE ARM.
15. AN APPROVED DAMPING DEVICE SHALL BE INSTALLED AS CLOSE AS POSSIBLE TO THE END OF THE ARM. MECHANICAL DAMPENING DEVICES SHALL BE INSTALLED ON ALL ARMS 59' OR LONGER. FLAT PLATE DAMPERS SHALL ONLY BE USED FOR NEW CONSTRUCTION IF DIRECTED BY THE PLANS OR THE ENGINEER. (SEE SHEETS 1 AND 2.)
16. A TENON SHALL BE PROVIDED TO ACCOMMODATE THE LUMINAIRE BRACKET ARM. (SEE SHEET 8).
17. PRODUCT SHOP DRAWINGS FOR ALL ITEMS SHALL BE SUBMITTED FOR APPROVAL TO THE CITY OF COLUMBUS.
18. THE STRUCTURAL INTEGRITY OF ALL PRODUCTS SHALL TAKE PRECEDENCE OVER STATED DESIGN DIMENSIONS IF THESE DIMENSIONS IN THE OPINION OF THE MANUFACTURER NEED TO BE INCREASED FOR THAT MANUFACTURER'S PRODUCT TO MEET THE REQUIRED DESIGN LOADING REQUIREMENTS. THE MANUFACTURER SHALL SUBMIT DESIGN CHANGES TO THE CITY OF COLUMBUS FOR REVIEW AND APPROVAL. THE STATED DIMENSIONS ARE SHOWN TO ALLOW FLEXIBILITY IN FUTURE PART REPLACEMENTS AND TO CREATE A STANDARD FOR THE INTERCHANGEABILITY OF PARTS WITHIN THE CITY OF COLUMBUS.
19. ALL PRE-DRILLED HOLES FOR ALL BID ITEMS SHALL BE DEBURRED AND FREE OF ALL SHARP EDGES. ALL OUTSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE ROLLED OR GROUND SMOOTH. ALL INSIDE WELDS ON MAST ARM STRUCTURES AND TRAFFIC PEDESTAL STRUCTURES SHALL BE VOID OF SHARP EDGES.
20. NO FOUNDATION BOLT PATTERN CHANGE SHALL BE ALLOWED FOR THE POLE SHAFT BASE PLATE. THE POLE BASE PLATE MUST FIT THE GIVEN FOUNDATION BOLT PATTERN AS SHOWN ON CITY OF COLUMBUS STANDARD CONSTRUCTION DRAWING 4160.

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21. SIGNAL SUPPORTS SHALL BE HOT DIPPED GALVANIZED AND COATED IN ACCORDANCE WITH THE PLANS.
22. SUPPORTS SHALL HAVE 1, 2, OR 3 HAND HOLES, AS PER PLAN DESIGN, EACH COMPLETE WITH A COVER, A RECTANGULAR OR ELLIPTICAL REINFORCED FRAME, AND A STAINLESS STEEL FASTENER FOR THE COVER. THE FASTENER SHALL BE FLUSH WITH THE HAND HOLE SURFACE. THE HAND HOLES SHALL BE LOCATED 180 DEGREES FROM THE MAST ARM UNLESS SPECIFIED OTHERWISE. (SEE SHEET 7.)
 - A.) THE HAND HOLE NEAR THE BRACKET ARM SHALL HAVE A MINIMUM INSIDE OPENING OF 3" X 5" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.
 - B.) THE HAND HOLE NEAR THE ARM ATTACHMENT SHALL HAVE A MINIMUM INSIDE OPENING OF 4" X 6" AND BE SIMILAR IN DESIGN TO THE BOTTOM HAND HOLE EXCEPT THAT NO GROUNDING PROVISION IS REQUIRED.
 - C.) THE BOTTOM HAND HOLE SHALL HAVE A MINIMUM INSIDE OPENING OF 4" X 8". A GROUNDING PROVISION CAPABLE OF ACCEPTING 4 - #4 AWG COPPER GROUNDING WIRES SHALL BE PROVIDED AND SHALL BE ATTACHED TO THE FRAME.
23. THE VERTICAL POLE SHAFT SHALL HAVE 16 SHARP FLUTES.
24. THE DECORATIVE BASE SHALL BE AS DETAILED ON SHEET 5.
25. SUPPORTS SHALL HAVE 1, 2 OR 3 WELDED CABLE SUPPORT HOOKS ('J' OR 'C' HOOKS) LOCATED ON THE INSIDE OF THE POLE AND 90 DEGREES FROM THE MAST ARM.
26. THE ARM SHALL MAINTAIN A CIRCULAR CROSS-SECTION (CONSTANT CROSS-SECTIONAL RADIUS).
27. THE ARM SHALL HAVE A REMOVABLE END-OF-ARM CAP ATTACHED BY A MINIMUM OF 3 STAINLESS STEEL SET SCREWS. THIS WILL BE THE ONLY ATTACHMENT METHOD ACCEPTABLE. THE INSIDE DIAMETER OF THE END-OF-ARM CAP SHALL BE EQUAL TO THE END-OF-ARM OUTSIDE DIAMETER PLUS TWO TIMES THE ARM TAPER.
28. THE ARM SHALL NOT HAVE PRE-DRILLED HOLES FOR SIGNAL HEAD CABLE ENTRY. THE CONTRACTOR SHALL FIELD DRILL THESE HOLES.
29. THE SUPPORTS SHALL BE DESIGNED USING THE 2009 EDITION OF THE AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY SIGNS, LUMINAIRES, AND TRAFFIC SIGNALS. THE FOLLOWING CRITERIA SHALL BE USED FOR THE DESIGN: BASIC WIND SPEED - 90 MPH, DESIGN LIFE - 25 YEARS, FATIGUE CATEGORY III. ADDITIONALLY, THE SUPPORT DESIGNS SHALL NOT INCLUDE GALLOPING OR TRUCK INDUCED GUST LOADING.
30. MAST ARM CONNECTION BOLTS SHALL BE ASTM A325 FOR DIAMETERS 1.50" AND SMALLER. BOLTS LARGER THAN DIAMETER 1.50" SHALL BE ASTM A449. DESIGNS 4 THROUGH 12 SHALL USE ASTM F436 FLAT WASHERS. DESIGN 13 AND C16 SHALL USE ASTM F959 DTI WASHERS. DESIGN 14 AND C15 SHALL USE ASTM F2437 TYPE 2 GRADE 5 DTI WASHERS. IF NECESSARY, I.D. OF DTI WASHERS SHALL BE GROUND OR REAMED TO FIT PROPERLY OVER ATTACHMENT BOLTS. PROVIDE PROPER DTI FEELER GAUGE TO ENGINEER. AN F436 WASHER SHALL BE USED DIRECTLY UNDER THE HEAD OF THE BOLT WITH ALL DTI WASHERS. ASSURE THAT THE FLAT WASHER DOES NOT SPIN DURING BOLT TIGHTENING WITH DTI WASHER. (SEE SHEETS 6 AND 8).
31. THE 4"X6" HAND HOLE (COMBINATION POLE ONLY) SHOULD BE PLACED ABOVE THE MAST ARM WHEN FEASIBLE. HAND HOLE MAY BE PLACED BELOW THE MAST ARM WHEN MAST ARM AND BRACKET ARM MOUNTING HEIGHTS DO NOT PROVIDE SUFFICIENT ROOM.

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